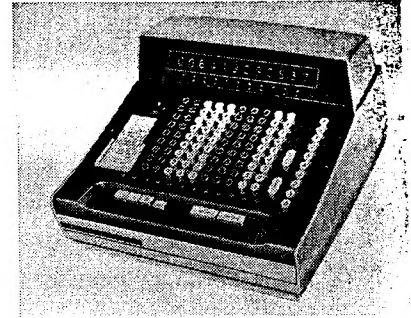




Entries and answers on Friden's 130 are displayed on cathode ray tube.



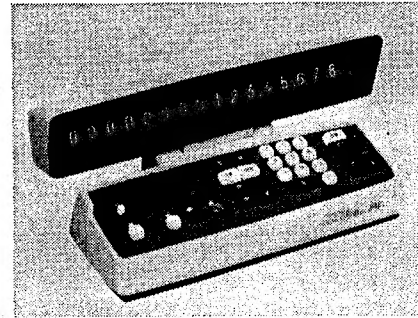
Cogito 240 from SCM has automatically positioning decimal point.



Anita Mark IX has interchangeable circuit boards, reducing down time.



3900 from Victor has 20-digit capacity in all five display registers.



Multiple access, with up to four key-boards, is feature of IME/USA system.



8-48 from Mathatronics has printed output, 100 column capacity.

Tools of the Office

Viewing the New Calculators

By DANIEL PECK, Associate Editor

IN 1964, only three electronic models appeared in *AM's Guide to Calculators*. At that time these machines were described as being "as new as tomorrow." As evidenced by the presence of many times more such models in our 1966 *Guide* on the following pages, electronic calculators are suddenly very much of today.

The new calculators are without question the most exciting recent development in the field of figuring machines. Their introduction has permitted the high-speed solving of complicated problems in many areas of business and science, without necessitating the use of highly expensive large-scale computers.

Designed initially for use in engineering and scientific projects, other possibilities in business are now opening. Research and development departments in large firms, for example, are find-

ing the speed and capacity of these new desk-top units of great value.

The new calculators are small but complex. Several compact models feature TV-type screens that display factors and answers. One machine remembers how a sample problem is done, and can repeat the steps in calculations involving different figures.

AUTOMATIC

TAKING advantage of internal programming, the new calculators make calculating a completely automatic process in some types of operations.

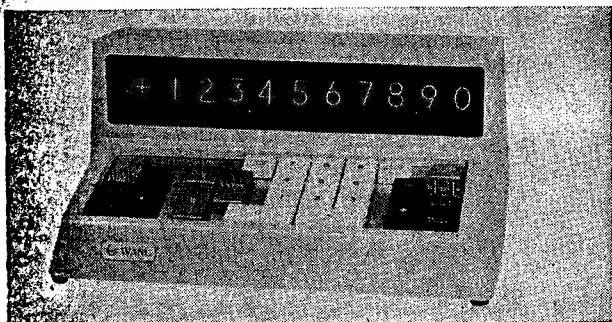
The fact that some of the units are not much larger than a desk telephone has given the user a great deal of flexibility. Increasing this flexibility even more is the introduction of remote calculating units which take turns using a large central calculator.

This has, in effect, made four or five machines out of one.

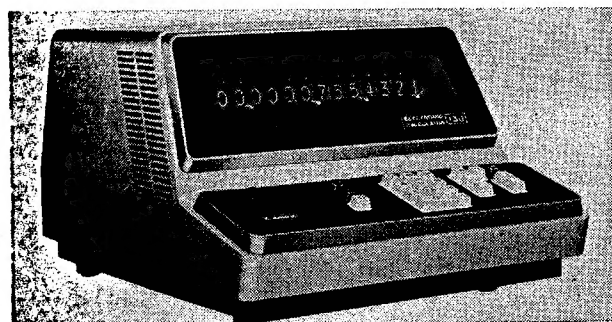
With all of these advances and EDP-like capabilities, the units hardly sound like the "grinding gears" calculating devices that we generally associate with the term. Actually, the only thing that the "new" calculators have in common with the "old," is that they both have keyboards and product registers.

The electronic calculator is really a small computer. It has no moving parts and as a result, its performance is relatively free from breakdowns. It performs operations by means of circuit blocks in which electronic components are taken up in so called counting circuits. Results are usually displayed with figure tubes or ring counters. There is no mechanical cycling and the device's speed is literally that of the speed of light.

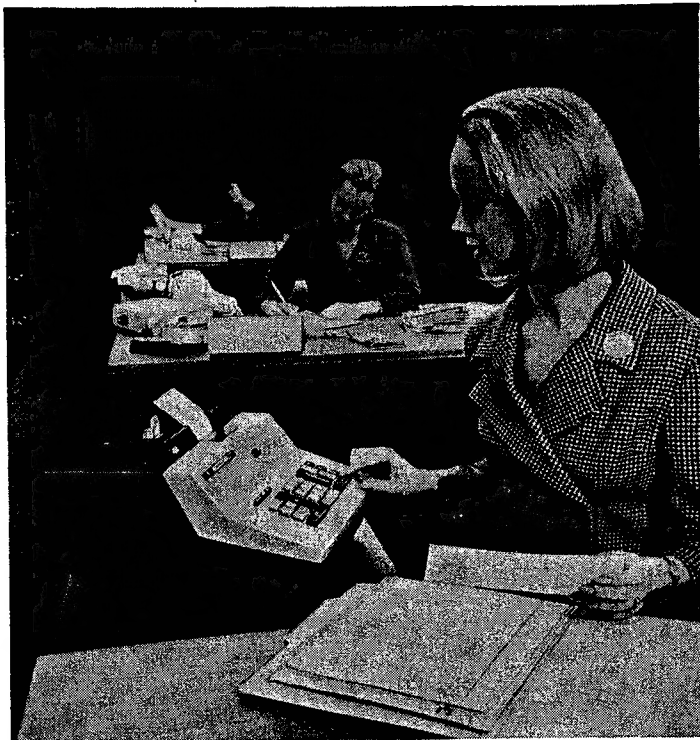
The primary advantage of the



Up to four keyboard consoles can be connected to central electronic package with system from Wang Laboratories.



Featuring luminous numerals 5/8 inches tall, Canon's Model 130 has fully automatic decimal point-off.



Epic 2000, from Monroe, can "learn" an operation the first time it does it and perform the function repetitively.

new calculators is speed. While a mechanical unit may have add time of about a second and multiply time of fractions of a minute, the electronic calculator has corresponding times of a few milliseconds to a few micro-seconds. One manufacturer claims these speeds for the following operations: addition and subtraction—1/100 second; multiplication—1/4 second; and division 1/2 second.

The significance of this speed in solving complex problems is that while the mechanical calculator is somewhat slower than human reaction time, the electronic calculator is considerably faster.

The new calculators are also completely silent in their operation. There are no wheels or gears to turn, so that the only noise involved is the sound of the keys being pressed. One manufacturer has reduced even this factor by producing a keyboard which requires a very light touch.

The speed of the electronic calculator in solving complicated problems has already been cited. But there is another time-saving advantage. One of the real limiting factors in the speed of solving

a problem is the manual entry of numbers. That is, in any complicated problem there are several intermediate results. These have to be copied down on a sheet of paper by the operator and reentered into the machine for further results. In addition to the added time involved, this procedure can also produce errors in the reentry.

STORAGE

THIS has been solved on the new units by the use of storage registers, which hold intermediate results within the machine. These can be recalled and operated upon by the pressing of keys.

Although the basic principle of operation is the same for all electronic machines, there is some variety in the way in which they handle the storage of factors.

One type of unit displays several registers as multi-digit lines on a cathode ray tube viewing screen. Keyboard entries and answers appear in the working register, which is the bottom line. Results of operations move upward into the registers as subsequent entries are made, where

they are available for further calculation.

This is known as the "stacking principle," and it makes it possible to work on multi-step problems in logical order, without the necessity of manually reentering amounts. All entries and answers are automatically aligned around a selected decimal point.

Thus, in any operation, a "store" keystroke replaces the copying down of a number, while a "recall" keystroke replaces the manual re-entry of the number.

This "stack" principle operates by the same general principle as does a dumb waiter. In the latter, when we remove a plate from the top, a new one pops up in its place. In the calculator, once the number at the bottom is operated upon, the entire stack drops down by one position.

In this type of calculator, pushing any arithmetic operation key will cause the bottom two numbers to be operated upon. The result is left in the bottom-most position and the top numbers drop down by one position. A new number being entered pops all registers up by one position, and appears at the bottom.

(To page 64)

AM's GUIDE TO CALCULATORS

MANUFACTURER OR DISTRIBUTOR	MODEL NAME	PRICE	TYPE	FULL OR ABRIDGED KEYBOARD	CAPACITY	FULLY OR SEMI-AUTOMATIC	STORAGE FACILITIES	BACK TRANSFER FEATURE	DECIMAL POINT IDENTIFICATION	INQUIRY CARD NO. TO CIRCLE FOR MORE DATA
ADDO-X, INC.	4353	\$499.50	Printing	Ten-Key	12/13	Fully automatic	No	No	Yes	160
ADDO-X, INC.	4653	\$699.50	Printing	Ten-Key	12/13	Fully automatic	Yes	No	Yes	160
ALMA OFFICE MACHINE CORP.	Plurimatic	\$385	Printing	Ten-Key	12/13	Fully automatic	Yes	No	No	161
BOHN BUSINESS MACHINES, INC.	Contex 10	\$139.50	Rotary	Ten-Key	11	Semi-automatic	—	—	Yes	162
BOHN BUSINESS MACHINES, INC.	Contex 30	\$235	Rotary	Ten-Key	11	Fully automatic	—	—	Yes	162
BURROUGHS CORP.	J700	\$320	Printing	Ten-Key	10/11	Semi-automatic	No	No	Yes	163
BURROUGHS CORP.	C1203	\$610	Keydrive	Full Keyboard	9/10	—	No	No	Yes	163
BURROUGHS CORP.	C1303	\$865	Keydrive	Full Keyboard	9/10	—	Yes	No	Yes	163
CANON CAMERA CO., INC.	130	\$1,355	Electronic	Ten-Key	13	Fully automatic	Yes	Yes	Yes	164
CHECK WRITER CO., INC.	8381	\$595	Printing	Ten-Key	12/13	Fully automatic	No	Yes	Yes	165
CHECK WRITER CO., INC.	5905	\$198	Rotary	Full Keyboard	21	Semi-automatic	Yes	No	No	165
CHECK WRITER CO., INC.	8561	\$595	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	Yes	165
CHECK WRITER CO., INC.	8361	\$445	Printing	Ten-Key	12/13	Fully automatic	No	Yes	Yes	165
CHECK WRITER CO., INC.	8641	\$325	Printing	Ten-Key	12/13	Semi-automatic	No	No	Yes	165
CHECK WRITER CO., INC.	8923	\$335	Rotary	Full Keyboard	21	Semi-automatic	Yes	No	No	165
DERO RESEARCH DEVELOPMENT CORP.	Sage I	\$995	Electronic	Ten-Key	10	Fully automatic	Yes	No	Yes	166
FACIT-ODHNER, INC.	CA 2-16	\$785	Rotary	Ten-Key	16	Fully automatic	Yes	Yes	Yes	167
FACIT-ODHNER, INC.	CA 1-13	\$525	Rotary	Ten-Key	13	Fully automatic	Yes	No	Yes	167
FRIDEN, INC.	132	\$1,950	Electronic	Ten-Key	13	Fully automatic	Yes	Yes	Yes	168
FRIDEN, INC.	130	\$1,695	Electronic	Ten-Key	13	Fully automatic	Yes	Yes	Yes	168
FRIDEN, INC.	SRQ	\$1,395	Rotary	Full/Ten-Key	21	Fully automatic	No	No	Yes	168
FRIDEN, INC.	SBQ	\$1,045	Rotary	Full/Ten-Key	21	Fully automatic	No	Yes	Yes	168
FRIDEN, INC.	SVE	\$975	Rotary	Full/Ten-Key	20	Fully automatic	No	No	Yes	168
FRIDEN, INC.	SBT	\$950	Rotary	Full/Ten-Key	20	Fully automatic	No	Yes	Yes	168
FRIDEN, INC.	STW-10	\$880	Rotary	Full/Ten-Key	20	Fully automatic	No	No	Yes	168
FRIDEN, INC.	SW-10	\$755	Rotary	Full/Ten-Key	20	Fully automatic	No	No	Yes	168
FRIDEN, INC.	CW-10	\$595	Rotary	Full Keyboard	20	Semi-automatic	No	No	Yes	168
FRIDEN, INC.	DW-8	\$475	Rotary	Full Keyboard	17	Semi-automatic	No	No	Yes	168
FRIDEN, INC.	STW-8	\$820	Rotary	Full/Ten-Key	17	Fully automatic	No	No	Yes	168
FRIDEN, INC.	SW-8	\$695	Rotary	Full/Ten-Key	17	Fully automatic	No	No	Yes	168
FRIDEN, INC.	CW-8	\$525	Rotary	Full Keyboard	17	Semi-automatic	No	No	Yes	168
FRIDEN, INC.	SVJ	\$1,095	Rotary	Full/Ten-Key	21	Fully automatic	No	Yes	Yes	168
IME/USA, INC.	IME-84	\$1,295	Electronic	Ten-Key	16	Fully automatic	Yes	Yes	Yes	169
INTER-CONTINENTAL TRADING	Anita Mark VIII	\$890	Electronic	Full Keyboard	10x10	Fully automatic	Yes	No	Yes	170
INTER-CONTINENTAL TRADING	Anita Mark IX	\$1,380	Electronic	Full Keyboard	10x10	Fully automatic	No	Yes	Yes	170
MARCHANT DIVISION OF SCM CORP.	240-SR	\$2,395	Electronic	Ten-Key	24	Fully automatic	Yes	Yes	Yes	171
MARCHANT DIVISION OF SCM CORP.	240	\$2,195	Electronic	Ten-Key	24	Fully automatic	Yes	Yes	Yes	171
MARCHANT DIVISION OF SCM CORP.	416-S	\$1,165	Rotary/Ptg.	Ten-Key	16	Fully automatic	Yes	Yes	Yes	171
MARCHANT DIVISION OF SCM CORP.	316	\$940	Rotary/Ptg.	Ten-Key	16	Fully automatic	Yes	Yes	Yes	171
MARCHANT DIVISION OF SCM CORP.	SK	\$985	Rotary	Full Keyboard	20	Fully automatic	Yes	No	Yes	171
MARCHANT DIVISION OF SCM CORP.	TR	\$945	Rotary	Full Keyboard	20	Fully automatic	Yes	Yes	Yes	171

Most electro-mechanical and electronic calculators on the American market are included in these charts.

Calculators CONTINUED

Another type of calculator applies an alternative method of dealing with two sets of numbers of intermediate answers. It sums and multiplies in two distinct registers. The results of addition and subtraction are left in one register, while the results of multiplication, division, square root, etc., are left in the other. This type of calculator allows independent sums and products to be randomly accumulated.

The ability to operate automatically from a pre-set program is another advantage of many of the new calculators. A calculator with the capacity to hold a program stores a sequence of operations which must always be

activated to do a particular computation. The operator simply enters the variable and pushes one key to start the computations. The machine then automatically steps through the "keystrokes" instead of the operator pushing the keys. Even though a program of this type falls short of the power inherent in the program in a general purpose computer, it still is much faster than a conventional mechanical calculator.

The features and capabilities of the various electronic calculators now available differ according to price and manufacturer, even though all offer comparable speed. One company, for instance, manufactures two electronic machines which are almost identical, the only differ-

ence being that one has an automatic square root key while the other does not.

Since calculators should be purchased for specific jobs and even for specific stations, a general rundown of some of the features available on the various models might be of use.

Additional memory units are available which store any factor by touching a key and bring it back to the working register at the touch of another key.

Automatic constant multiplier or divisor permits the repeated use of the same multiplier or divisor automatically, as a by-product of a regular operation.

Automatic repeat addition or subtraction can be accomplished by repeatedly touching the Add

AM's GUIDE TO CALCULATORS

MANUFACTURER OR DISTRIBUTOR	MODEL NAME	PRICE	TYPE	FULL OR ABRIDGED KEYBOARD	CAPACITY	FULLY OR SEMI-AUTOMATIC	STORAGE FACILITIES	BACK TRANSFER FEATURE	DECIMAL POINT IDENTIFICATION	INQUIRY CARD NO. TO CIRCLE FOR MORE DATA
MARCHANT DIVISION OF SCM CORP.	10 CMA	\$895	Rotary	Full Keyboard	20	Fully automatic	Yes	No	Yes	171
MARCHANT DIVISION OF SCM CORP.	8 CMA	\$835	Rotary	Full Keyboard	16	Fully automatic	Yes	No	Yes	171
MARCHANT DIVISION OF SCM CORP.	10 CM	\$755	Rotary	Full Keyboard	20	Fully automatic	No	No	Yes	171
MARCHANT DIVISION OF SCM CORP.	8 CM	\$695	Rotary	Full Keyboard	16	Fully automatic	No	No	Yes	171
MARCHANT DIVISION OF SCM CORP.	505	\$595	Rotary	Ten-Key	16	Fully automatic	No	Yes	Yes	171
MARCHANT DIVISION OF SCM CORP.	8 CDT	\$495	Rotary	Full Keyboard	16	Semi-automatic	No	No	Yes	171
MATHATRONICS, INC.	4-24	\$3,490	Electronic	Full Keyboard	100	Fully automatic	Yes	Yes	Yes	172
MATHATRONICS, INC.	8-48	\$4,990	Electronic	Full Keyboard	100	Fully automatic	Yes	Yes	Yes	172
MATHATRONICS, INC.	8-48 APS	\$7,490	Electronic	Full Keyboard	100	Fully automatic	Yes	Yes	Yes	172
MONROE INTERNATIONAL, INC.	EPIC 2000	\$2,000	Electronic	Ten-Key	16	Electronic	Yes	Yes	Yes	173
MONROE INTERNATIONAL, INC.	PC 1421	\$1,175	Rotary/Ptg.	Ten-Key	21	Fully automatic	Yes	Yes	Yes	173
MONROE INTERNATIONAL, INC.	IQ-213	\$1,085	Rotary	Full Keyboard	21	Fully automatic	Yes	Yes	Yes	173
MONROE INTERNATIONAL, INC.	IQ-10 213	\$980	Rotary	Full Keyboard	21	Fully automatic	Yes	Yes	Yes	173
MONROE INTERNATIONAL, INC.	8F-213	\$915	Rotary	Full Keyboard	21	Fully automatic	Yes	Yes	Yes	173
MONROE INTERNATIONAL, INC.	6F-212	\$815	Rotary	Full Keyboard	21	Fully automatic	Yes	No	Yes	173
MONROE INTERNATIONAL, INC.	CSA-10	\$755	Rotary	Full Keyboard	21	Fully automatic	Yes	No	Yes	173
MONROE INTERNATIONAL, INC.	Mach 1.07	\$755	Printing	Ten-Key	16	Fully automatic	Yes	Yes	No	173
MONROE INTERNATIONAL, INC.	4F4-212	\$595	Rotary	Full Keyboard	21	Semi-automatic	Yes	No	Yes	173
MONROE INTERNATIONAL, INC.	3F3-162	\$475	Rotary	Full Keyboard	16	Semi-automatic	Yes	No	Yes	173
OLIVETTI UNDERWOOD	M-20	\$346	Printing	Ten-Key	10/11	Fully automatic	No	No	No	174
OLIVETTI UNDERWOOD	M-24	\$425	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	No	174
OLIVETTI UNDERWOOD	M-24 GT	\$560	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	No	174
OLIVETTI UNDERWOOD	D24	\$625	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	No	174
OLIVETTI UNDERWOOD	D24 GT	\$725	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	No	174
OLIVETTI UNDERWOOD	TET	\$875	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	No	174
PAILLARD, INC.	165	\$470	Printing	Ten-Key	12/13	Fully automatic	Yes	Yes	Yes	175
PAILLARD, INC.	365	\$395	Printing	Ten-Key	12/13	Fully automatic	No	No	Yes	175
REMINGTON OFFICE MACHINES	DX 94 Calculator	\$399.50	Printing	Ten-Key	10	Semi-automatic	No	No	No	176
REMINGTON OFFICE MACHINES	DM 99120	\$575	Printing	Ten-Key	14/12	Fully automatic	—	—	Yes	176
REMINGTON OFFICE MACHINES	104	\$750	Printing	Ten-Key	16/17	Fully automatic	Yes	Yes	Yes	176
VICTOR COMPTOMETER CORP.	3900	\$1,825	Electronic	Ten-Key	20	Fully automatic	Yes	Yes	Yes	177
VICTOR COMPTOMETER CORP.	79	\$635	Printing	Ten-Key	14	Fully automatic	No	Yes	Yes	177
VICTOR COMPTOMETER CORP.	75	\$570	Printing	Ten-Key	11	Fully automatic	No	Yes	Yes	177
VICTOR COMPTOMETER CORP.	73	\$495	Printing	Ten-Key	11	Fully automatic	No	No	Yes	177
VICTOR COMPTOMETER CORP.	72	\$395	Printing	Ten-Key	11	Fully automatic	No	No	Yes	177
VICTOR COMPTOMETER CORP.	12 ML	\$445	Printing	Ten-Key	12	Fully automatic	Yes	Yes	Yes	177
VICTOR COMPTOMETER CORP.	9D	\$865	Keydrive	Full Keyboard	10	Semi-automatic	Yes	Yes	Yes	177
VICTOR COMPTOMETER CORP.	9E	\$610	Keydrive	Full Keyboard	10	Semi-automatic	No	Yes	Yes	177
WANG LABORATORIES, INC.	300	\$1,690	Electronic	Ten-Key	10	Fully automatic	Yes	Yes	Yes	178
WANG LABORATORIES, INC.	310	\$1,895	Electronic	Ten-Key	10	Fully automatic	Yes	Yes	Yes	178
WANG LABORATORIES, INC.	320	\$2,095	Electronic	Ten-Key	10	Fully automatic	Yes	Yes	Yes	178
WYLE LABORATORIES, INC.	W. S. 02	\$4,100	Electronic	Ten-Key	24	Fully automatic	Yes	Yes	Yes	179

Manual models and adding machines are not included. Dashes represent information unavailable at press time.

or Subtract bar on some units.

Automatic round-off/drop-off, available on some models, provides accurate answers to whatever decimal place is selected.

Floating decimal will automatically position the decimal point in the result.

Constant factors can be held (in storage registers and memory units) and as automatic constant multiplicand or divisor.

Automatic grand totals are provided by storage registers, which give automatic positive or negative accumulation of results of multiplication or division calculations.

Constant dividend is obtainable on some units by placing the factor in the memory unit; it can be repeatedly recalled by touching a key.

Automatic credit balances on some machines are identified by a minus sign when negative totals occur.

Safety features such as locking of the keyboard and/or a flashing light indicate when an improper entry has been made, or when a result will go beyond the limits of the machine's digit capacity.

Keyboards on the electronic machines are available as both full and ten-key types although most are ten-key.

Displays are available as figures on a cathode ray tube or as individually illuminated numerals, depending on the manufacturer.

Just as with the larger computer systems, the number of features and the capacity of in-

dividual machines range according to price. What about price? Just how expensive are the new calculators? First, they are generally much more expensive than the more conventional rotary and printing calculators, which are now the predominant types being used in offices. This is true even though a few models, primarily foreign made, are being sold for under a thousand dollars.

Does this, then, make the electronic calculator a machine suited best for scientific and engineering fields and not for commercial business purposes? It depends on whom you ask. A great deal of controversy exists about the future markets of the new calculators.

One executive in the calculator field sees very little future

for the new machines for general office use. His argument is that present day rotary and printing calculators do a satisfactory job and that they are improving all the time. Secondly, he points out that the extremely high speed of the electronic models is usually not needed in general calculating functions, and that the high cost of the new machines makes their purchase unwise.

A contrasting view is offered by another executive in the field who feels there is even now a definite trend toward the extensive use of electronic calculators for commercial use. The prohibiting factor at this time is cost, but he argues that as the production of the new calculators becomes more sophisticated, the price of full-featured electronic machines may come down enough to make their purchase feasible for wide commercial use.

Another individual goes so far as to suggest that the introduc-

tion of desk-top electronic calculators represents "the beginning of the end" of electro-mechanical calculators. He feels that particularly those electronic models selling for under a thousand dollars pose an immediate and strong threat to all rotary calculators and also to the high end of printing calculators.

LOWER-PRICED

IT IS true that there are models selling for not much more than the higher-priced rotary calculators. It has been pointed out, however, that with some of the "under \$1000" machines, some essential features for office work may be lacking. Automatic decimal point, for instance, is necessary in accumulation, a function important in many aspects of general office calculating. Obviously, the purchase of any of the lower-priced models (as well as the high-priced ones)

should be preceded by a thorough examination of which specific features are needed to do a particular job.

The real answer to the present and future place of electronic calculators in offices probably lies somewhere in the middle of these varied opinions. At this time, there are already many business applications for electronic models. Already mentioned have been the heavy demands of research and development departments but any job which requires high speed and capacity might require an electronic machine.

The question, "Do I need an electronic calculator now?" is probably best answered by another question: "Why do I need a calculator?" Calculators should be bought for *specific* purposes and even for specific stations.

Since the introduction of the first commercially practical calculating machine, one advance has followed another. The important thing to bear in mind is that the introduction of an improved model with additional features did not *de facto* render the previous model obsolete.

Just as the introduction of electricity didn't put the hand-operated model on the scrap heap, the electronic calculator will probably not eliminate the needs of people for electro-mechanical machines.

NEED

CERTAINLY the businessman who uses a machine for calculating a few invoices a day has no need for the tremendous speed and capacity of today's electronic models.

Conversely, the office with the high volume of invoices that must be repetitively processed might well use the new electronic calculator with programming capability and printout. Need is the key to the dilemma.

Certainly there is a continuing need for the many fine electro-mechanical calculators now on the market and for the adding and other figuring machines

NCR makes a better adding machine.

It figures.

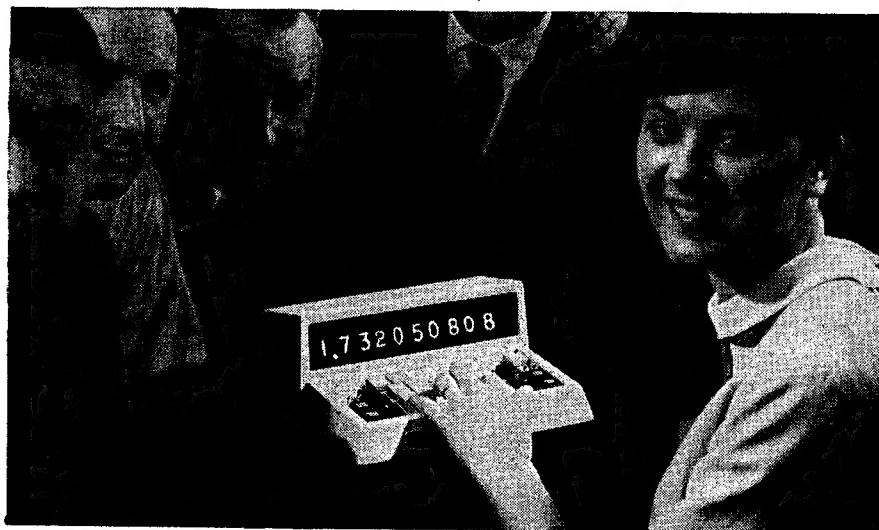
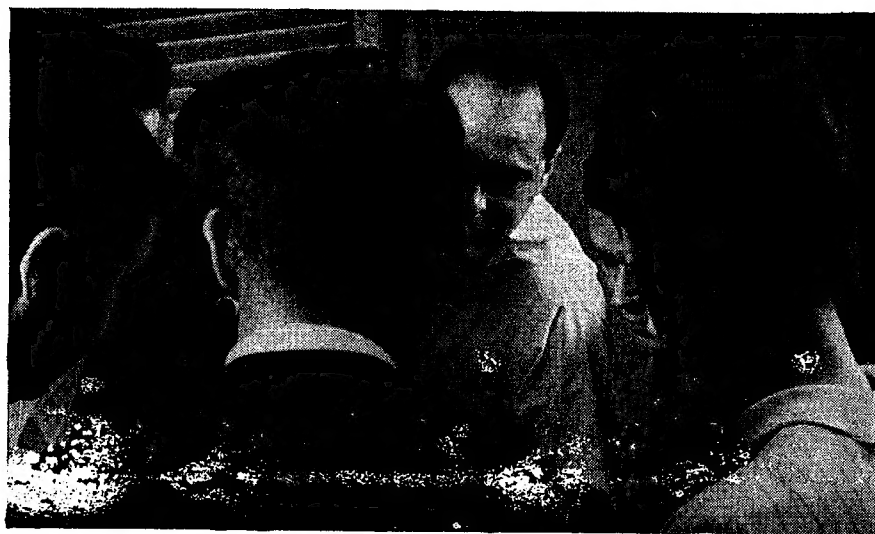


For free booklet that tells how you can get more use out of your present adding machines — figuring interest, discounts, margin, mark-up, and other time-saving short-cuts — write NCR, Dayton, Ohio 45409. No obligation.

N C R

THE NATIONAL CASH REGISTER COMPANY, DAYTON, OHIO

(Circle No. 43 on Reader Inquiry Card)



Business Model 300 . . . \$1690., Statistical Model 310 . . . \$1895., Scientific Model 320 . . . \$2095.

Lucky!

She's the most popular girl in the office since the boss bought her a WANG Model 300 solid-state calculator.

Everybody wants to try it. Small wonder. The Model 300 is the fastest, easiest to operate electronic calculator on the market, and one of the most versatile.

Operators love it because of its silent operation, the large, easy-to-read characters which display entries and results instantaneously, the automatically-positioned floating decimal point, and the exclusive "phantom touch" keyboard which eliminates fatigue, even after hours of operation.

Bosses love it because of its speed and flexibility. It performs all arithmetic operations in a fraction of a second. Dual add/subtract registers per-

mit random entry and recall of data, and duplex product and entry accumulation. And single keys on (Model 310) provide instantaneous squares and square roots.

Everybody loves it because it costs only \$1690, complete with compact electronics package. And best of all, up to 3 additional keyboard console units, costing only \$475 each, may be used with the original electronics package.

Incidentally, many business offices are interested in the scientific version (Model 320), which provides $\ln(x)$ and e^x keys . . . priced at only \$2095.

There's more to tell about the WANG Model 300, 310 and 320. Let us send you new descriptive literature. Write today to:

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Calculators CONTINUED

available. Each has an important place which can be summarized as follows.

Briefly, if your needs in a particular station are for addition and subtraction only what you need is an adding machine. Although multiplication (done by repeat-addition) and division (done by repeat-subtraction) can be accomplished with adding machines, these are generally cumbersome procedures.

When your needs include multiplication and division, a calculator is the logical choice. Since we have already examined the capabilities of the new electronic machines, we will discuss here the three other basic types of calculating units: rotary, printing and key driven machines.

PRINTING

A printing calculator is basically an adding machine which automatically multiplies and divides, and prints the numbers entered and the results of the calculations on a paper tape. Although the printing calculator is generally slower than the rotary type, it does have certain distinct advantages.

First, all the factors of a problem are preserved for reference. The tape provides a record, not only of the result, but of the elements that went into the problem.

Another related advantage is that errors can be checked much more easily, especially since the sign of the arithmetic function that has been performed is usually printed on the tape.

A couple of important features found on several printing calculators and related to the charts on the preceding pages are back transfer and decimal point identification.

The first, back transfer, enables the operator to easily accomplish multiplication involving more than two factors. It utilizes a memory register to temporarily store the product of the first two numbers of the problem. It is then multiplied by the next number. The operator,

Friden

using the back transfer key, can then store this product in memory and multiply it by a subsequent number. This process is continued until the entire problem is completed.

As for the second feature, many machines are equipped with some sort of mechanical device that identifies the proper position for the decimal point in addition and subtraction.

Storage facilities are not the mark of electronic calculators alone. Some conventional calculators have a version of this feature as well. A memory feature enables the operator of such a machine to enter a constant factor that will be used over again into the machine. He can bring it out of memory as often as he wishes by merely pressing the proper control key. Usually, a number stays in memory until it is replaced by another.

Rotary calculators are typically full keyboard models that do not print, although some have a ten-key keyboard. Usually, rotary calculators show the results of calculations in rows of rotating number dials.

ADVANTAGES

The rotary calculators have distinct advantages of their own over the printing types, the first of which is greater speed, especially in division. Another is greater flexibility in the handling of a series of interrelated operations without reentry of intermediate results. A third advantage is greater column capacity for multiplication and division problems.

The advantages of rotary over printing calculators are most obvious in the handling of complex interrelated problems.

Key-driven calculators are never printing models, and are always of full keyboard design. The results are shown on visual number dials, which are seen through windows which are often located on the bottom of the machine.

The key-driven machine is particularly suited to high-speed addition and subtraction because the operator can enter all the digits at the same time. ☐



How much faster is an electronic calculator? On Accounts Payable, Gimbels found it 43% faster.

Recently, Gimbel Brothers Department Store in Philadelphia, Pa., tested the new 130 Electronic Calculator by Friden against the mechanical calculators they've been using.

The tests consisted of 300 invoices, totaling 757 invoice lines. To make the comparison completely realistic, the tests were conducted by Gimbel employees, using actual invoices.

It was hardly a contest.

The time required to complete the invoices on a rotary calculator was 265 minutes (or 67.9 invoices per hour.)

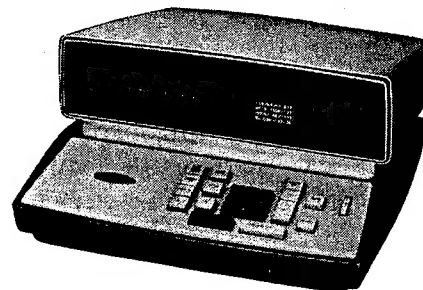
The 130 Electronic Calculator required only 185 minutes (or 97.3 invoices per hour.) 43.3% faster!

Today there are six new 130's in Gimbel's Accounts Payable Department with more to come. And productivity has stepped up accordingly.

The 130 is completely noiseless, works in milliseconds, and displays intermediate answers on a small TV screen. The cost is just \$1,695, while Model 132 with automatic square root is \$1950.

If you'd like a demonstration, call the nearest Friden office. Or write to Friden, Inc., San Leandro, California. Sales & service throughout the world.

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The 130 Electronic Calculator by Friden

(Circle No. 46 on Reader Inquiry Card)